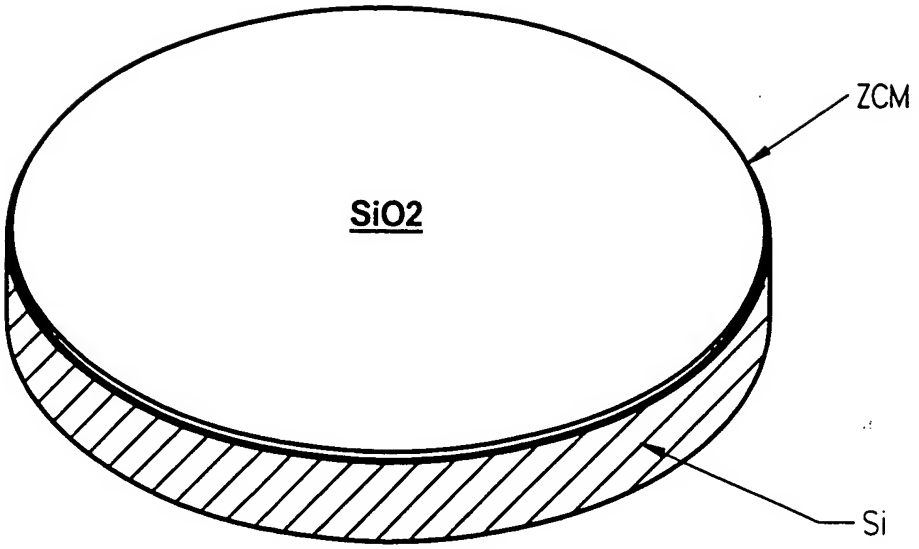


FIG. 1a

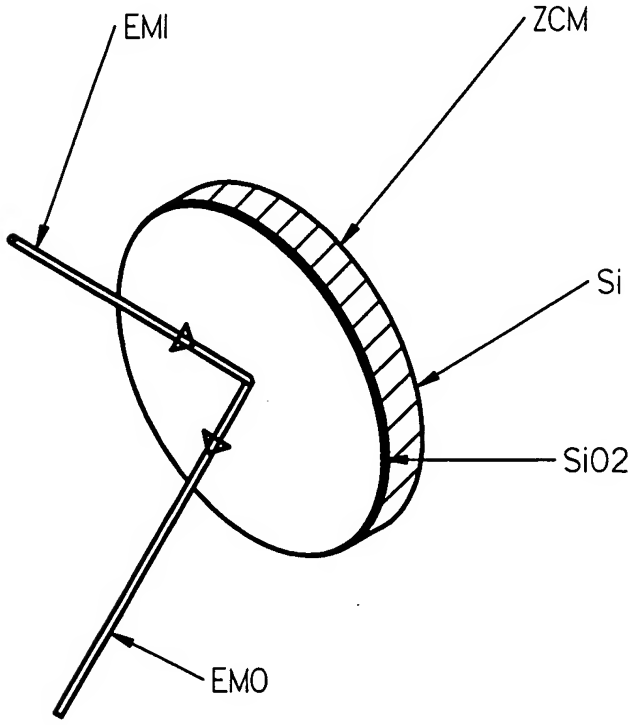


FIG. 1b

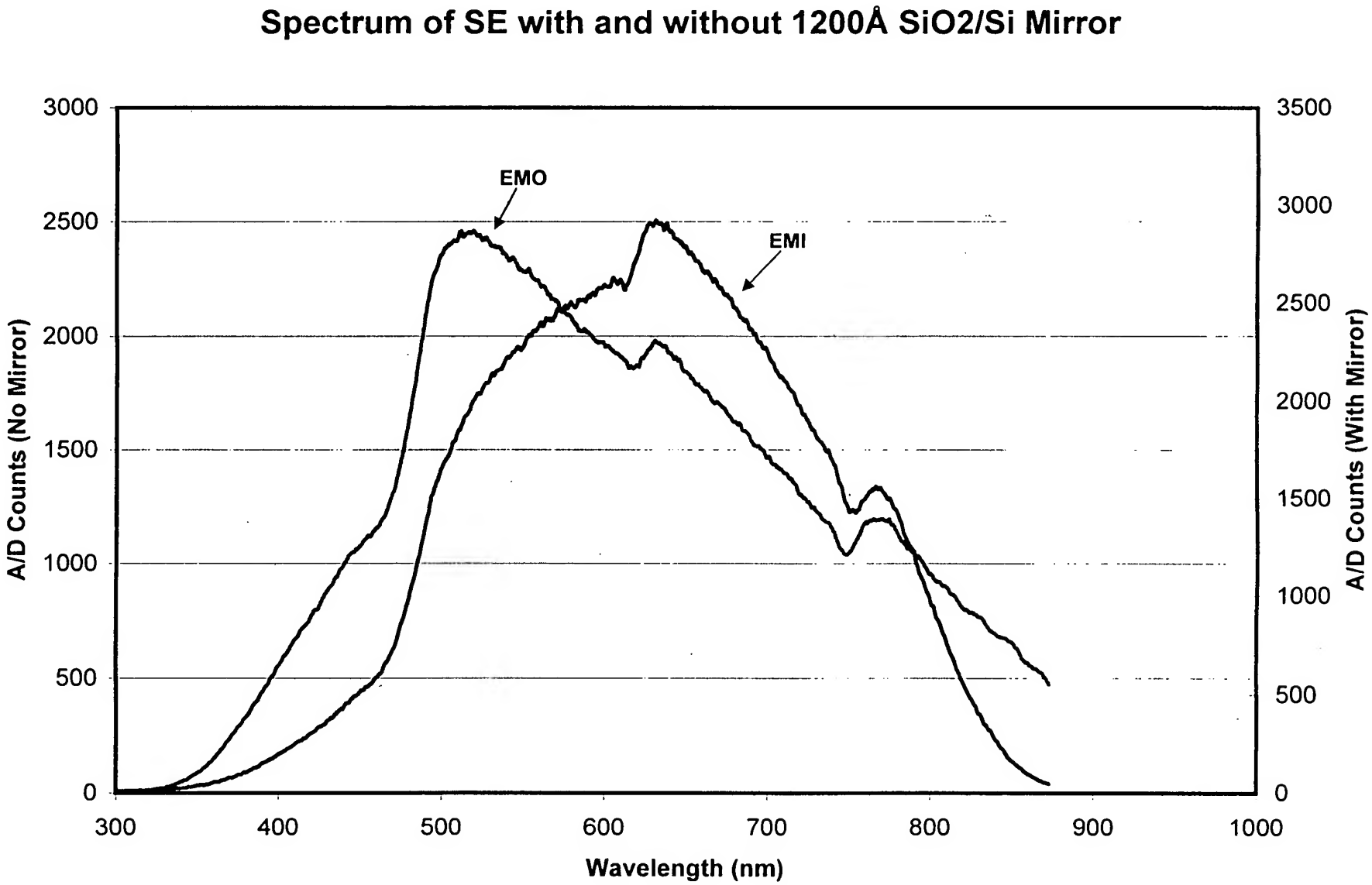

Spectrum of SE with and without 1200Å SiO2/Si Mirror
EMO
EMI
A/D Counts (No Mirror)
A/D Counts (With Mirror)
Wavelength (nm)
0
500
1000
1500
2000
2500
3000
3500
300
400
500
600
700
800
900
1000

FIG. 2

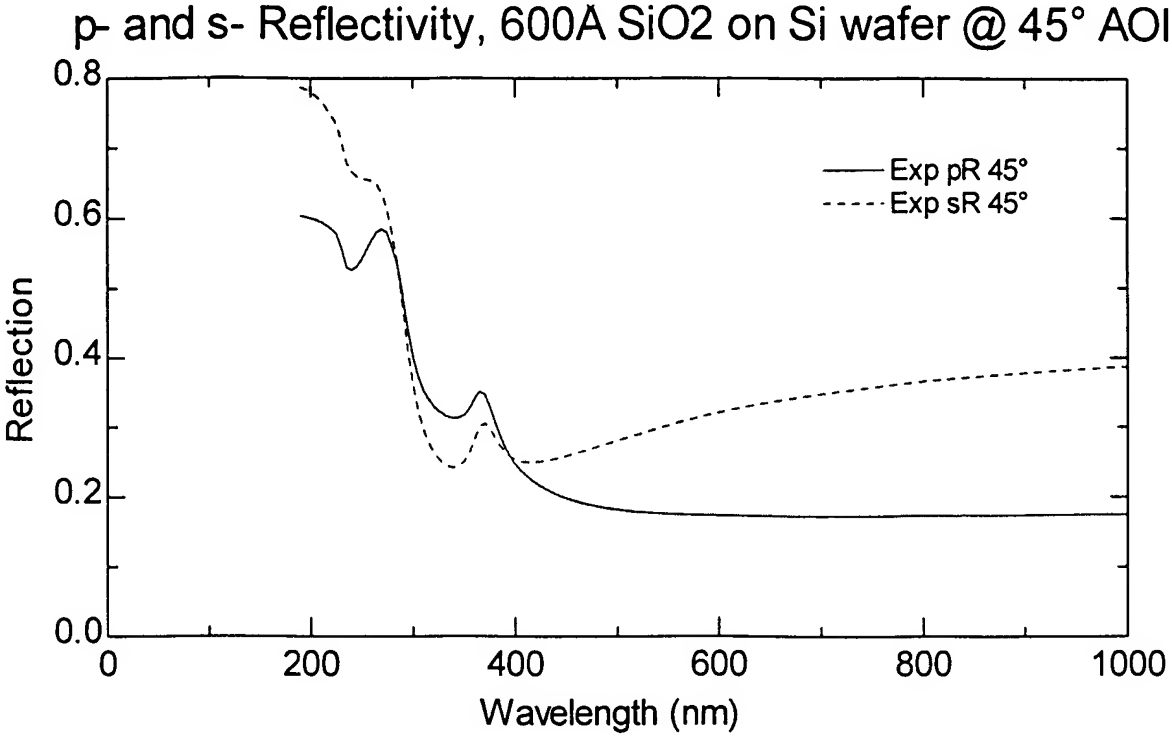

p- and s- Reflectivity, 600A SiO2 on Si wafer @ 45° AOI
Exp pR 45°
Exp sR 45°
Reflection
Wavelength (nm)
0.0
0.2
0.4
0.6
0.8
0
200
400
600
800
1000

FIG.4

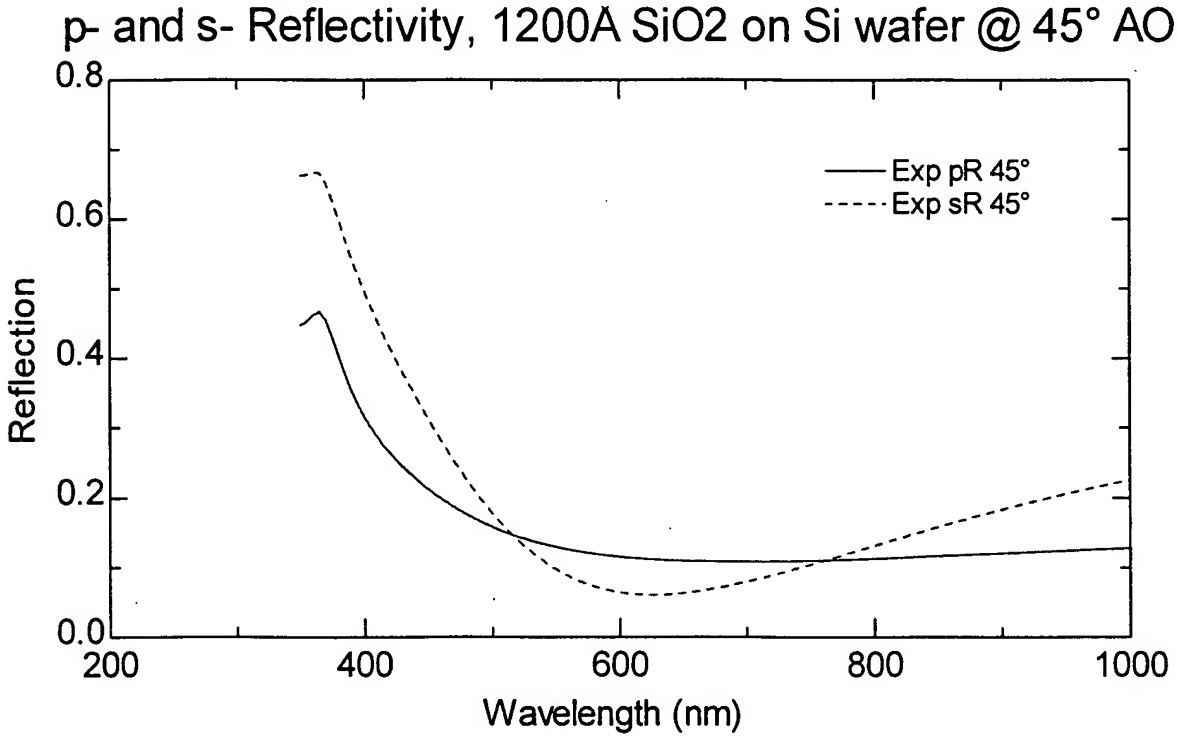

p- and s- Reflectivity, 1200A SiO2 on Si wafer @ 45° AOI
Exp pR 45°
Exp sR 45°
Reflection
Wavelength (nm)
0.0
0.2
0.4
0.6
0.8
200
400
600
800
1000

FIG. 3

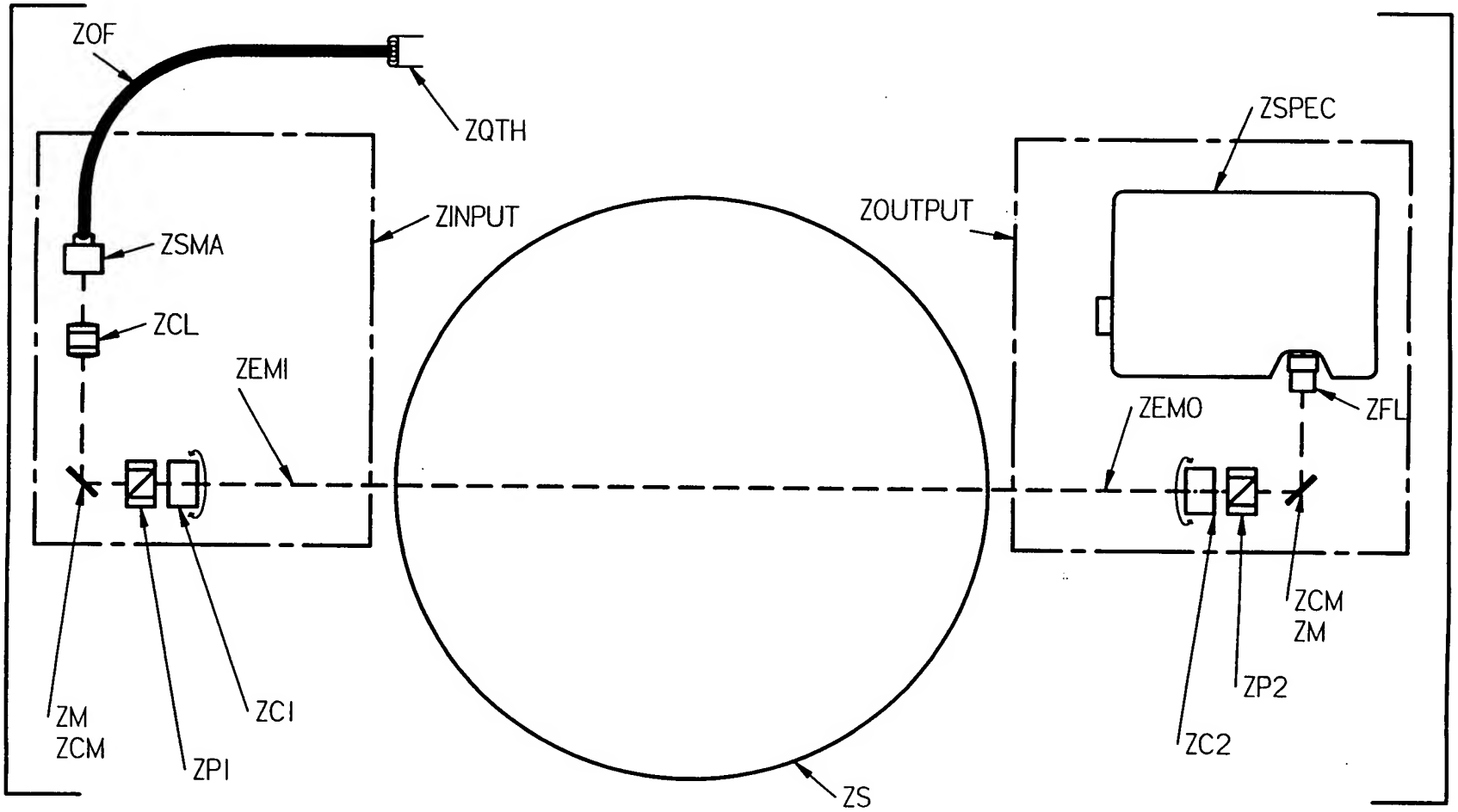

ZOF
ZQTH
ZSPEC
ZINPUT
ZOUTPUT
ZSMA
ZCL
ZEMI
ZEMO
ZFL
ZM
ZCM
ZP1
ZC1
ZCM
ZM
ZP2
ZC2
ZS

FIG. 5

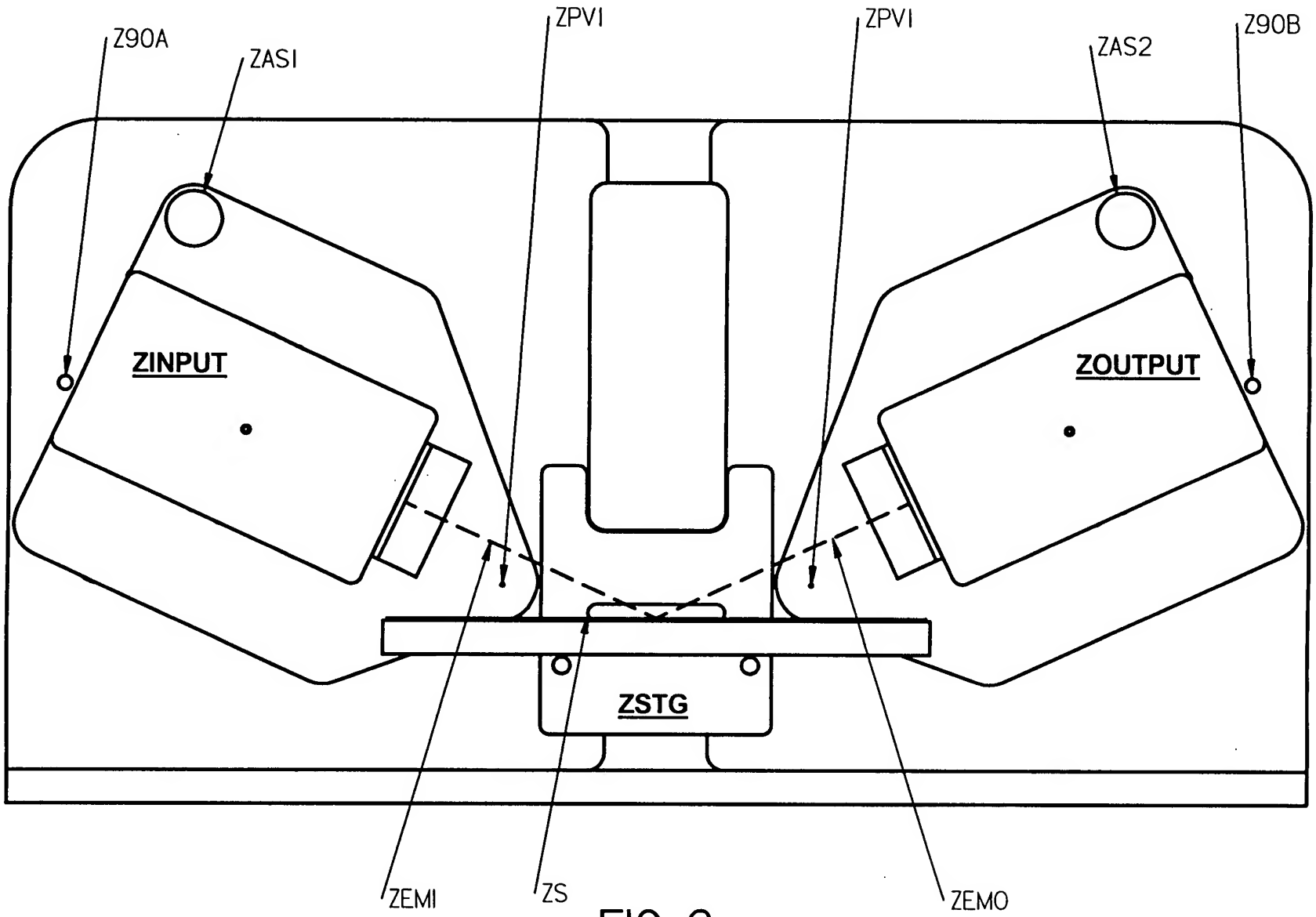

Z90A
ZAS1
ZPV1
ZPV1
ZAS2
Z90B
ZINPUT
ZOUTPUT
ZSTG
ZEMI
ZS
ZEMO

FIG. 6

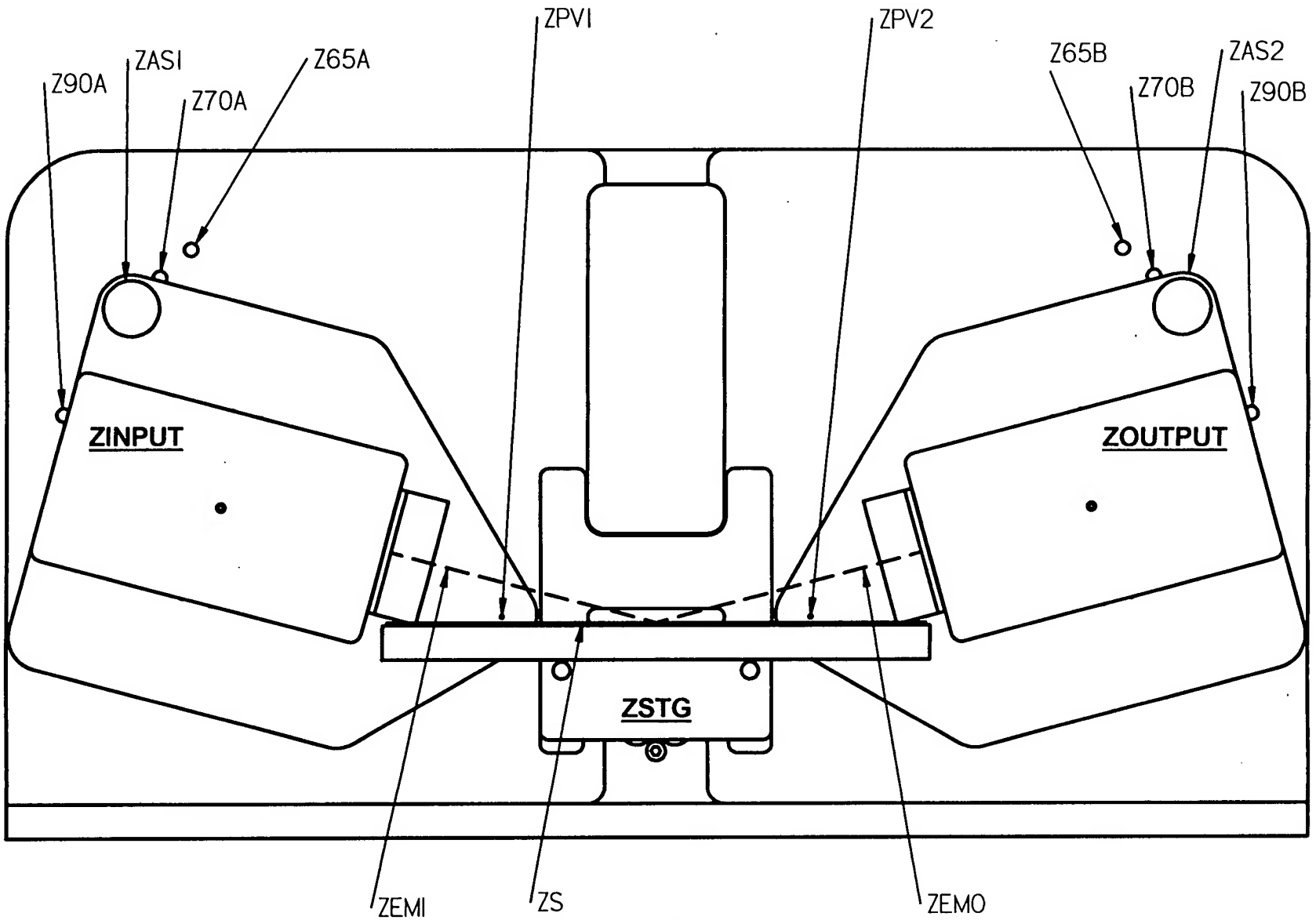

Z90A
ZASI
Z70A
Z65A
ZPVI
ZPV2
Z65B
Z70B
ZAS2
Z90B
ZINPUT
ZOUTPUT
ZSTG
ZEMI
ZS
ZEMO

FIG. 7

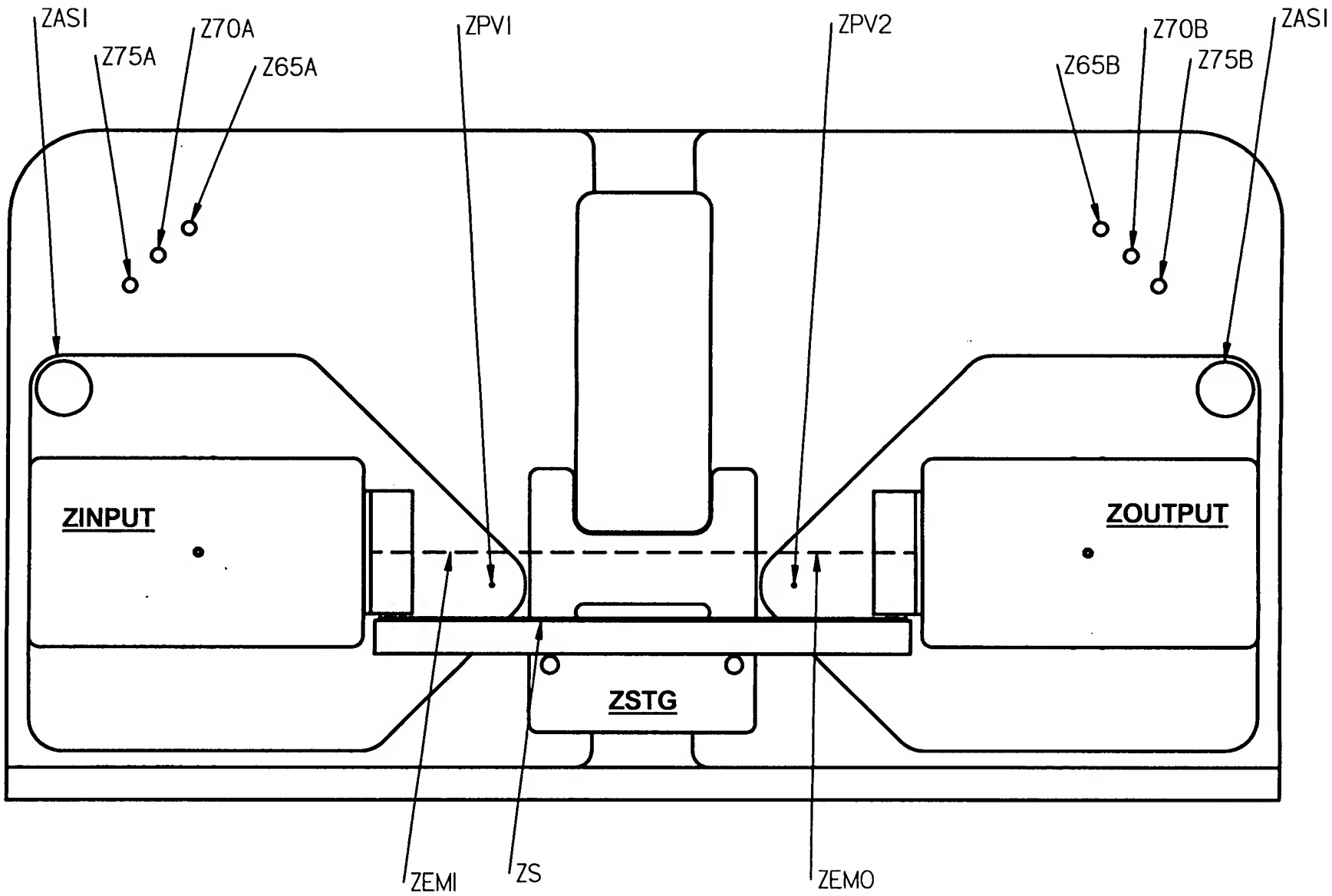

ZASI
Z75A
Z70A
Z65A
ZPV1
ZPV2
Z65B
Z70B
Z75B
ZASI
ZINPUT
ZOUTPUT
ZSTG
ZEMI
ZS
ZEMO

FIG. 8

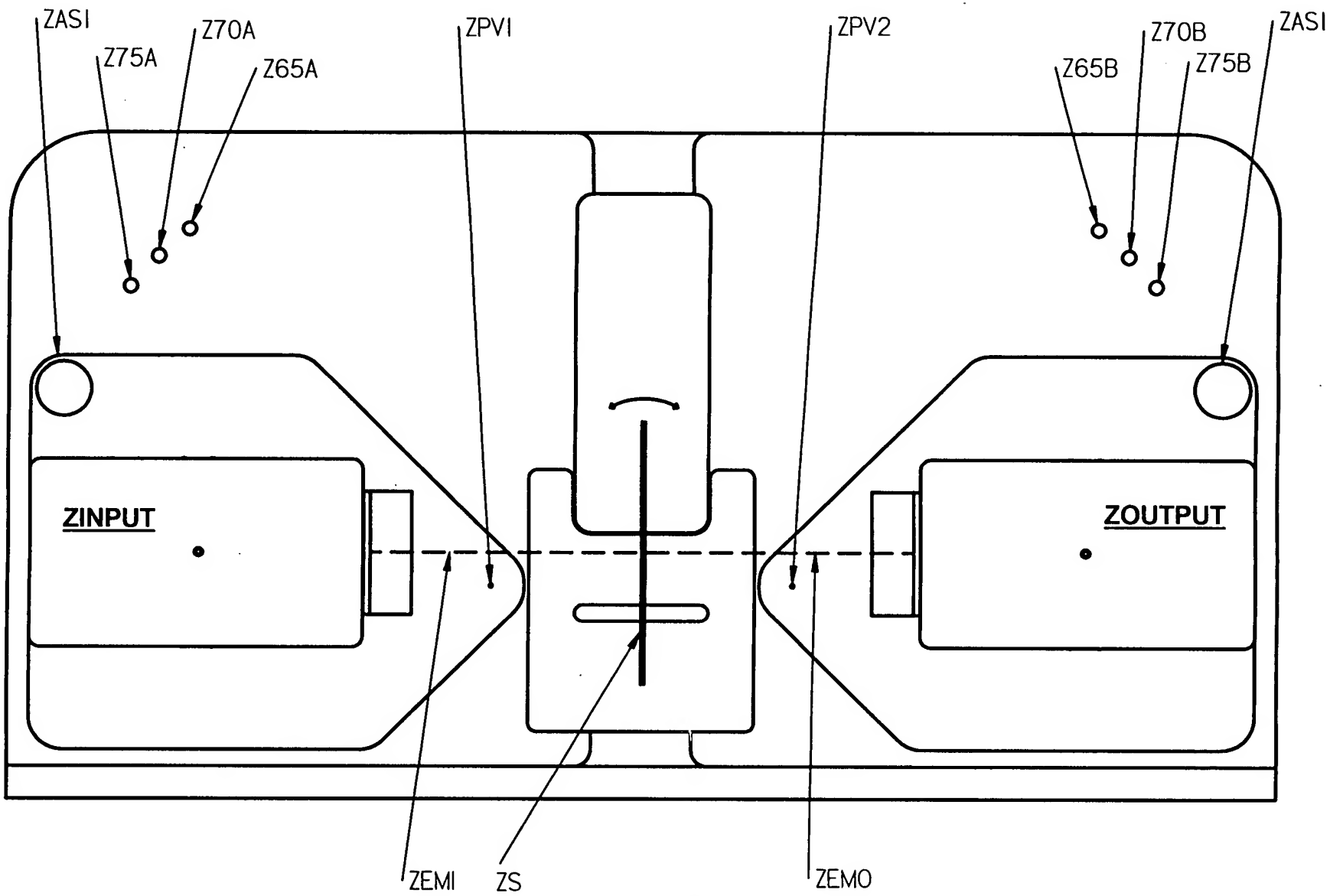

ZASI
Z75A
Z70A
Z65A
ZPV1
ZPV2
Z65B
Z70B
Z75B
ZASI
ZINPUT
ZOUTPUT
ZEMI
ZS
ZEMO

FIG. 9

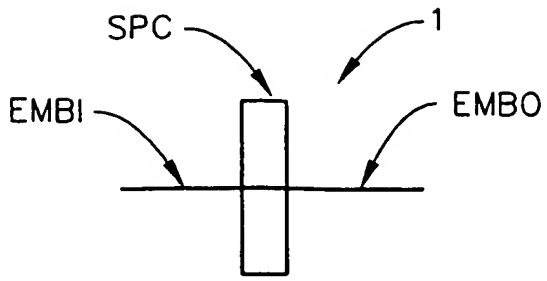


FIG. 10a

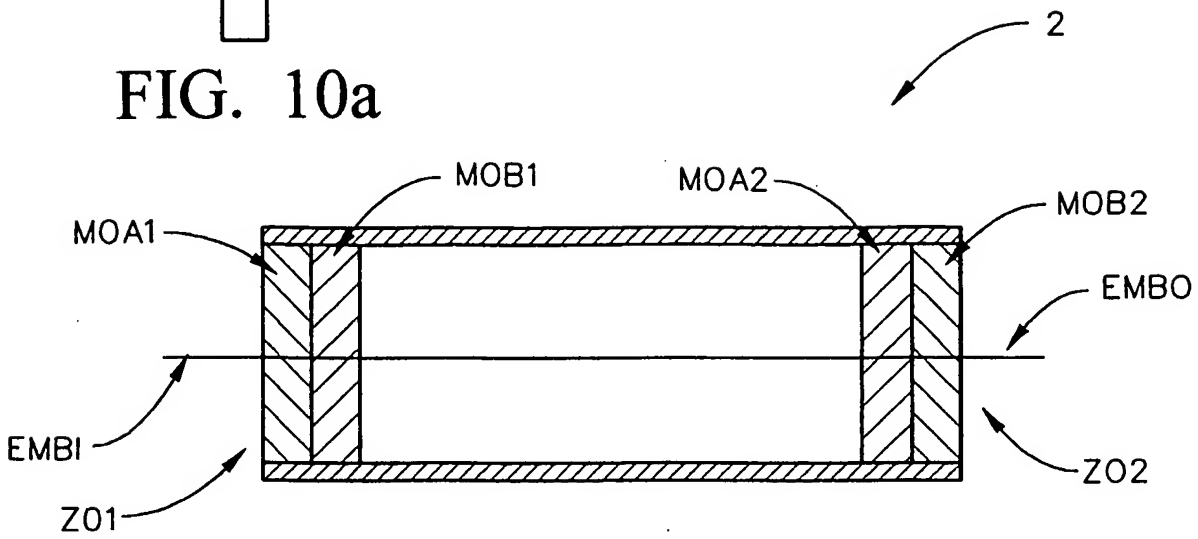


FIG. 10b

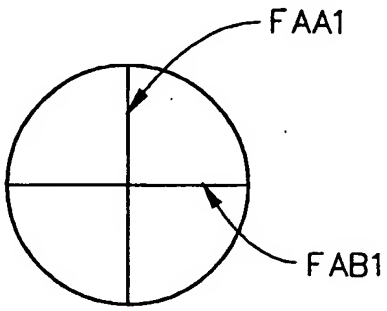


FIG. 10c

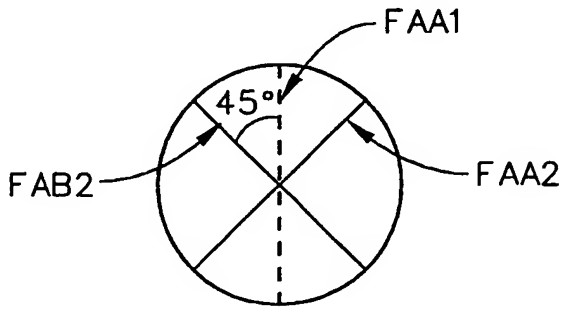


FIG. 10d

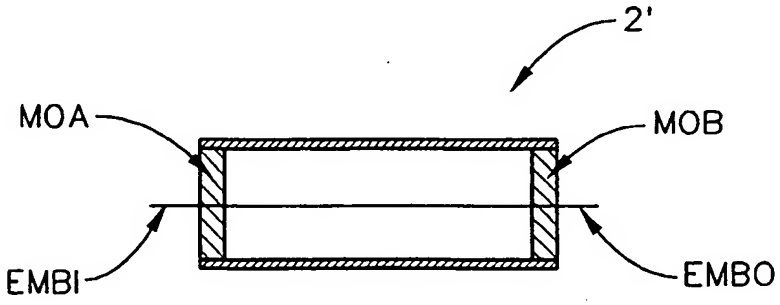
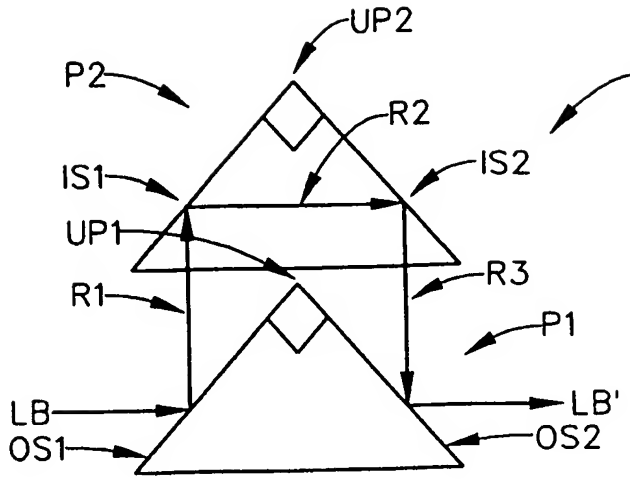
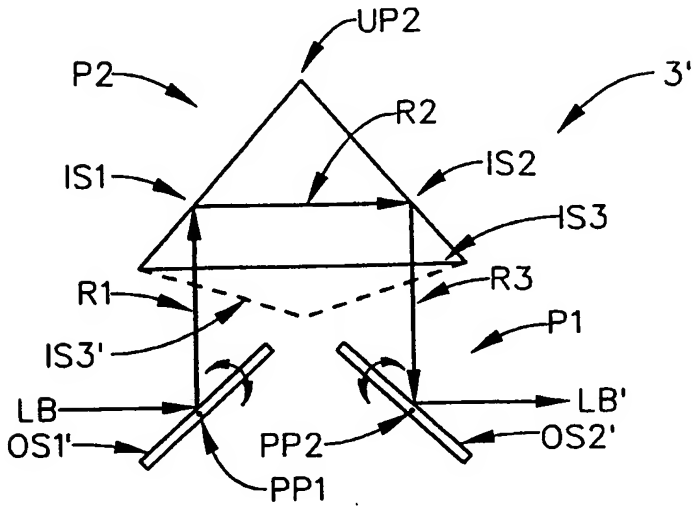


FIG. 10e



10f1



10f2

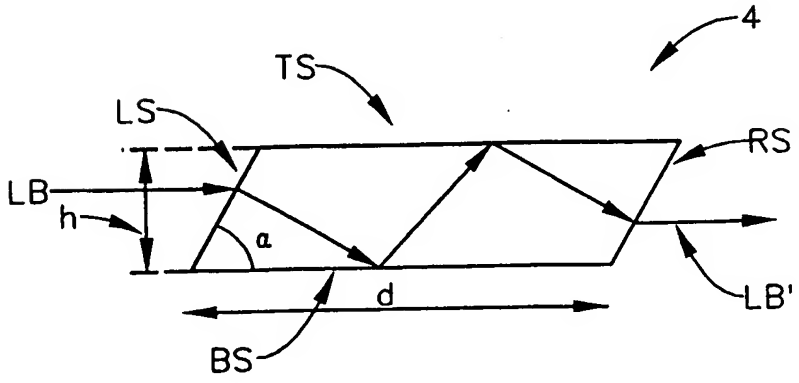


FIG. 10g

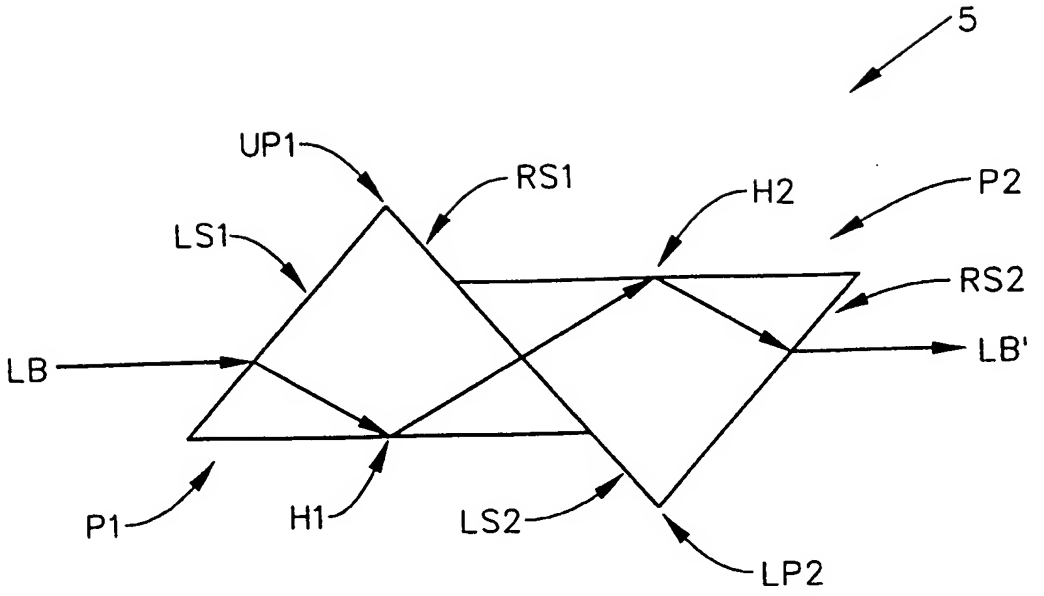


FIG. 10h

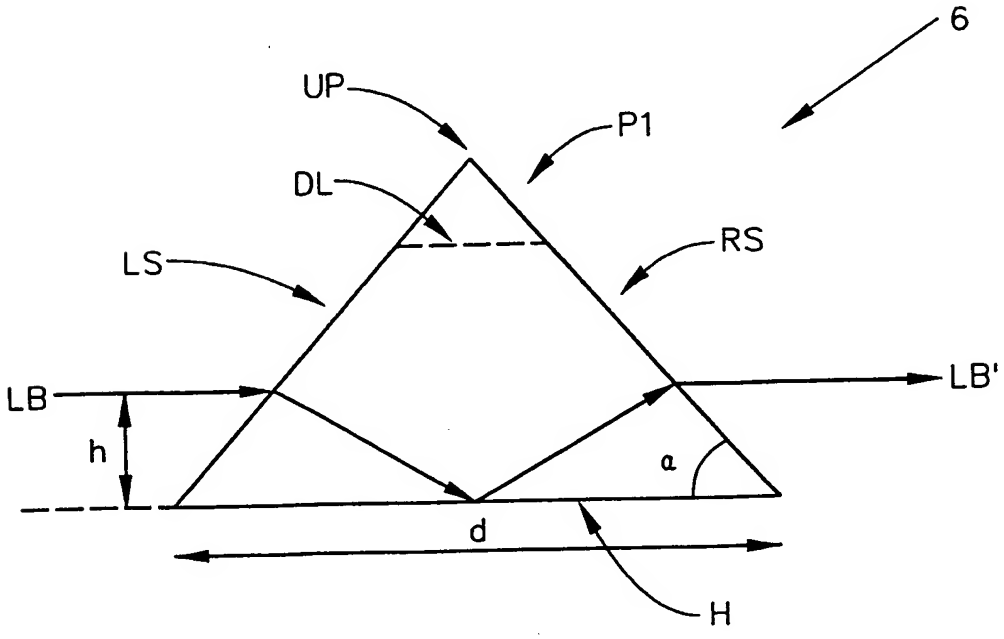


FIG. 10i

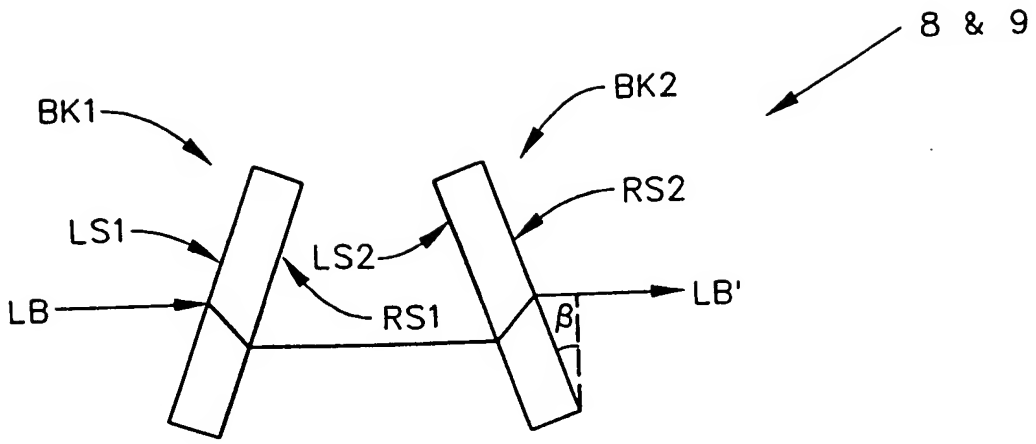


FIG10j1

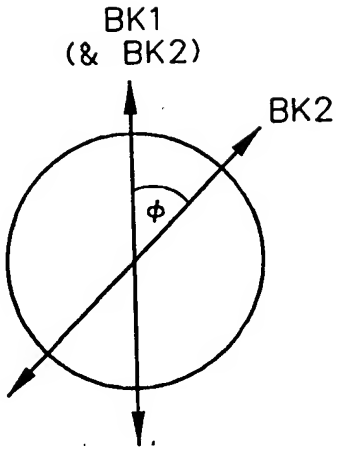


FIG. 10J2

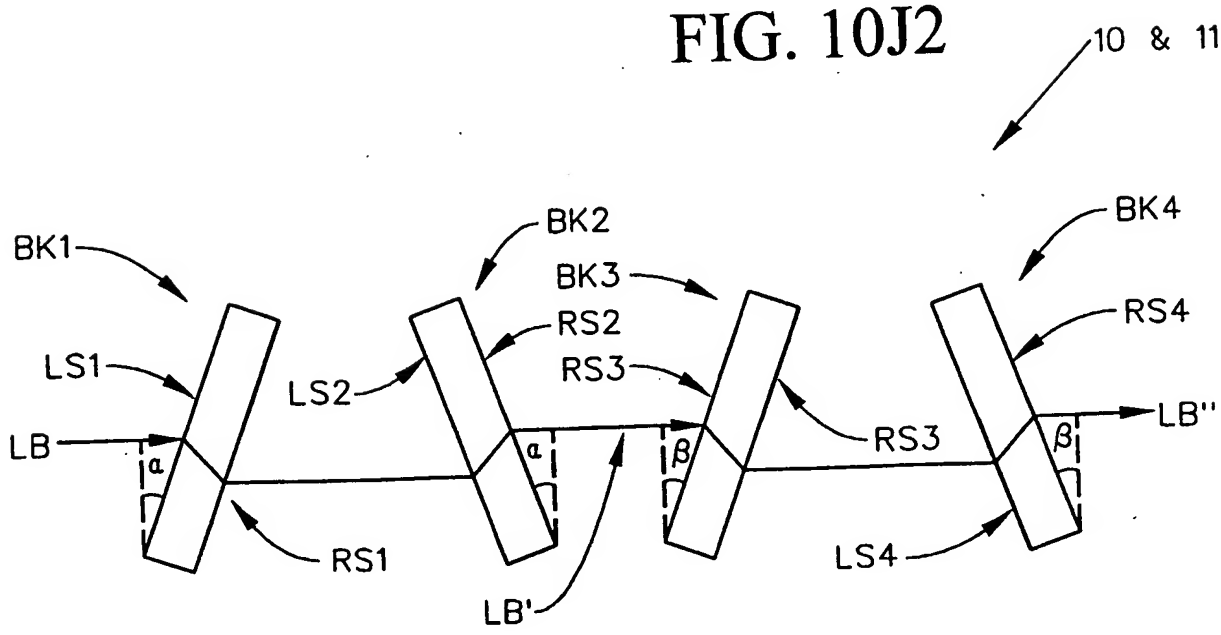


FIG. 10k1

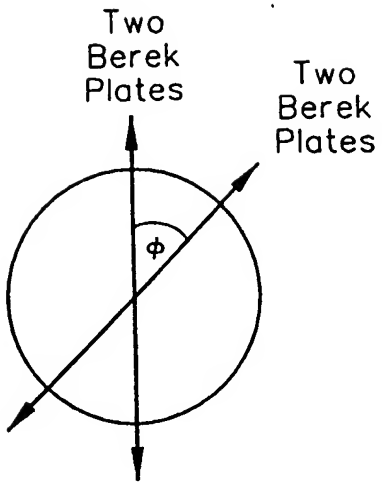


FIG. 10k2

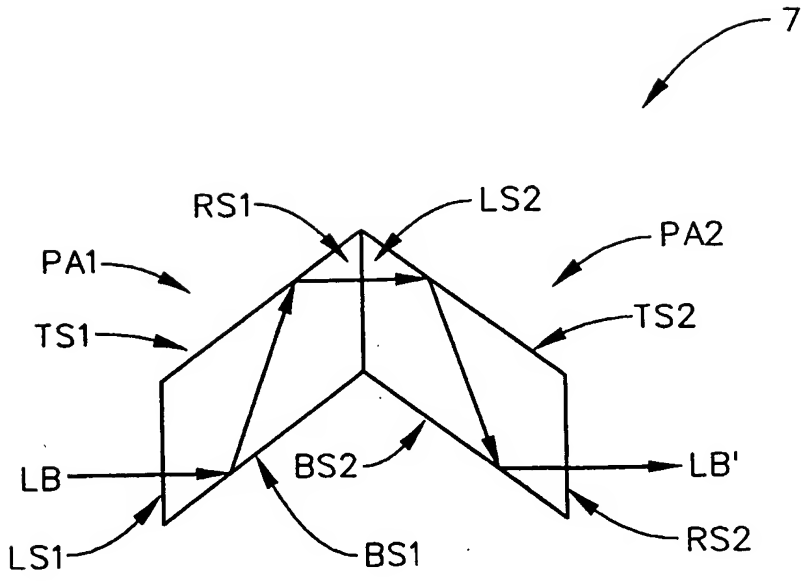


FIG. 10l

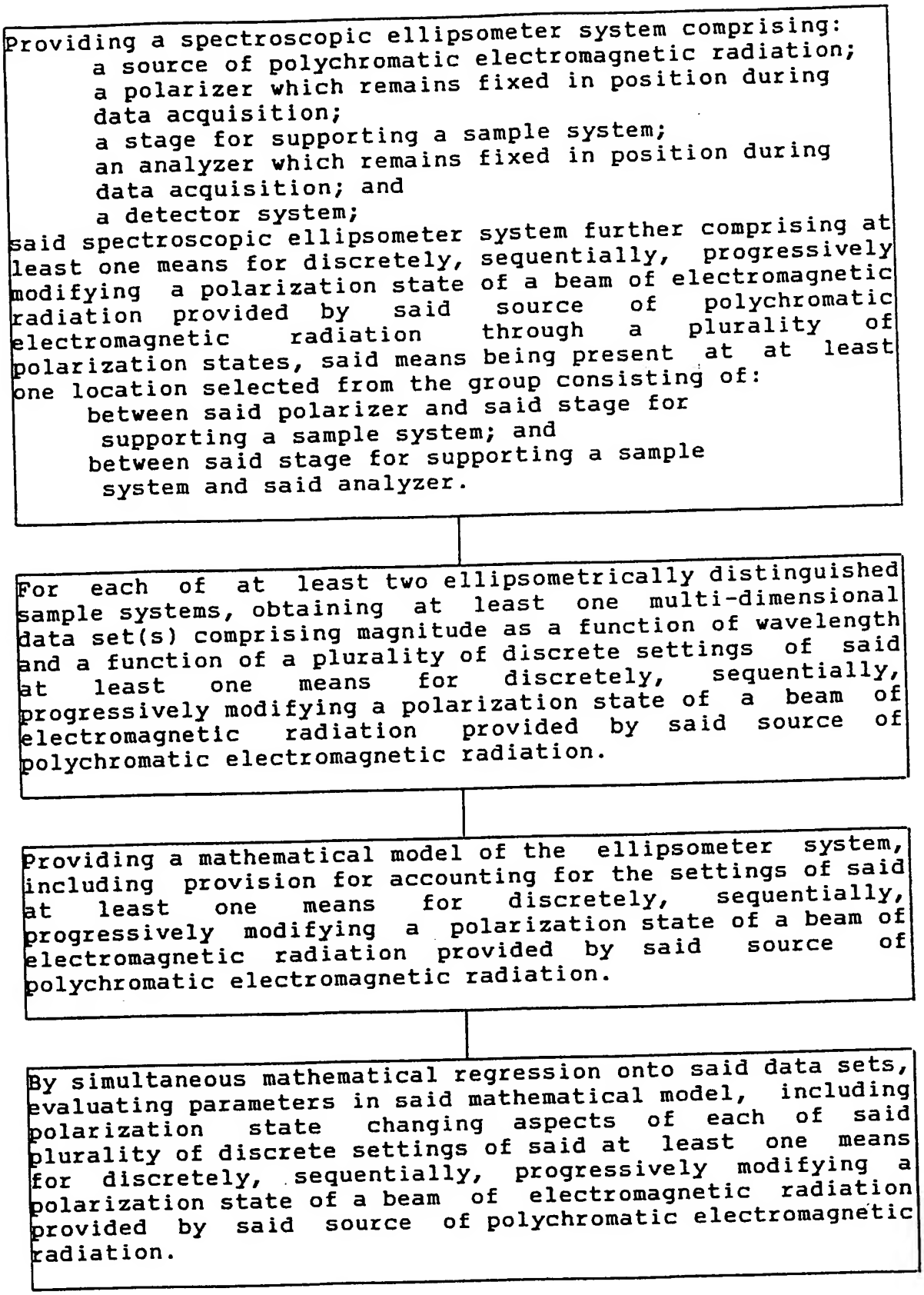

Providing a spectroscopic ellipsometer system comprising:
a source of polychromatic electromagnetic radiation;
a polarizer which remains fixed in position during data acquisition;
a stage for supporting a sample system;
an analyzer which remains fixed in position during data acquisition; and
a detector system;
said spectroscopic ellipsometer system further comprising at least one means for discretely, sequentially, progressively modifying a polarization state of a beam of electromagnetic radiation provided by said source of polychromatic electromagnetic radiation through a plurality of polarization states, said means being present at at least one location selected from the group consisting of:
between said polarizer and said stage for supporting a sample system; and
between said stage for supporting a sample system and said analyzer.
For each of at least two ellipsometrically distinguished sample systems, obtaining at least one multi-dimensional data set(s) comprising magnitude as a function of wavelength and a function of a plurality of discrete settings of said at least one means for discretely, sequentially, progressively modifying a polarization state of a beam of electromagnetic radiation provided by said source of polychromatic electromagnetic radiation.
Providing a mathematical model of the ellipsometer system, including provision for accounting for the settings of said at least one means for discretely, sequentially, progressively modifying a polarization state of a beam of electromagnetic radiation provided by said source of polychromatic electromagnetic radiation.
By simultaneous mathematical regression onto said data sets, evaluating parameters in said mathematical model, including polarization state changing aspects of each of said plurality of discrete settings of said at least one means for discretely, sequentially, progressively modifying a polarization state of a beam of electromagnetic radiation provided by said source of polychromatic electromagnetic radiation.

FIG. 11

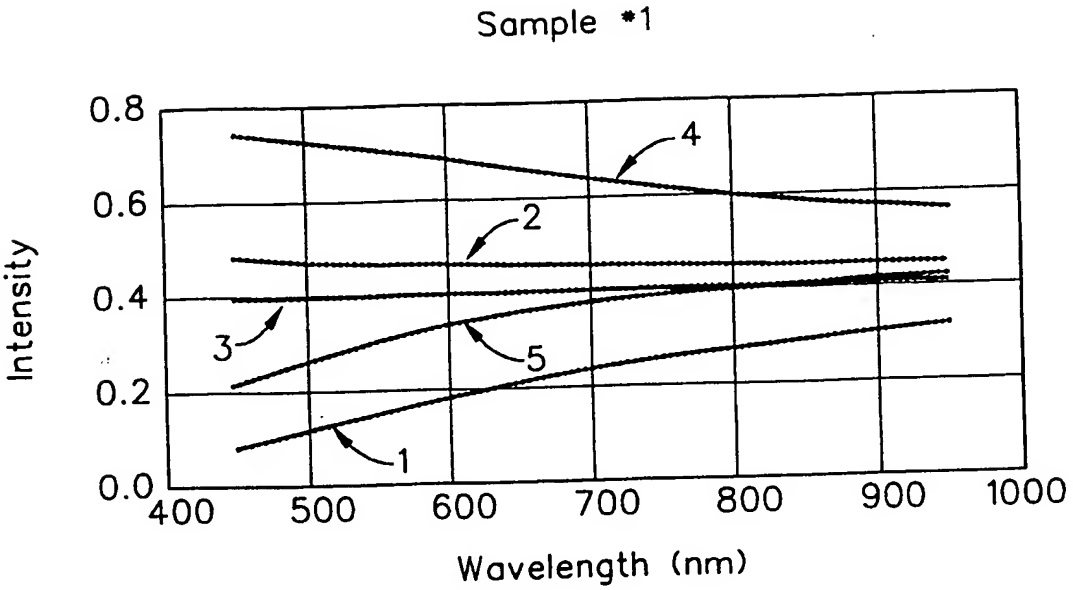

Sample *1
0.8
0.6
0.4
0.2
0.0
Intensity
400
500
600
700
800
900
1000
Wavelength (nm)
1
2
3
4
5

FIG. 12

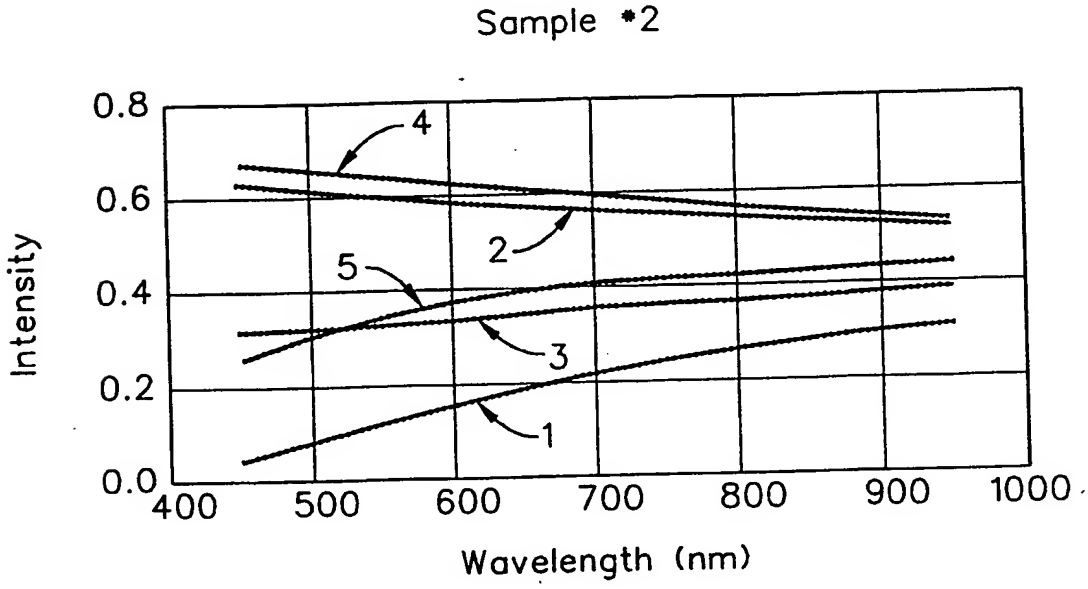

Sample *2
0.8
0.6
0.4
0.2
0.0
Intensity
400
500
600
700
800
900
1000
Wavelength (nm)
1
2
3
4
5

FIG. 13

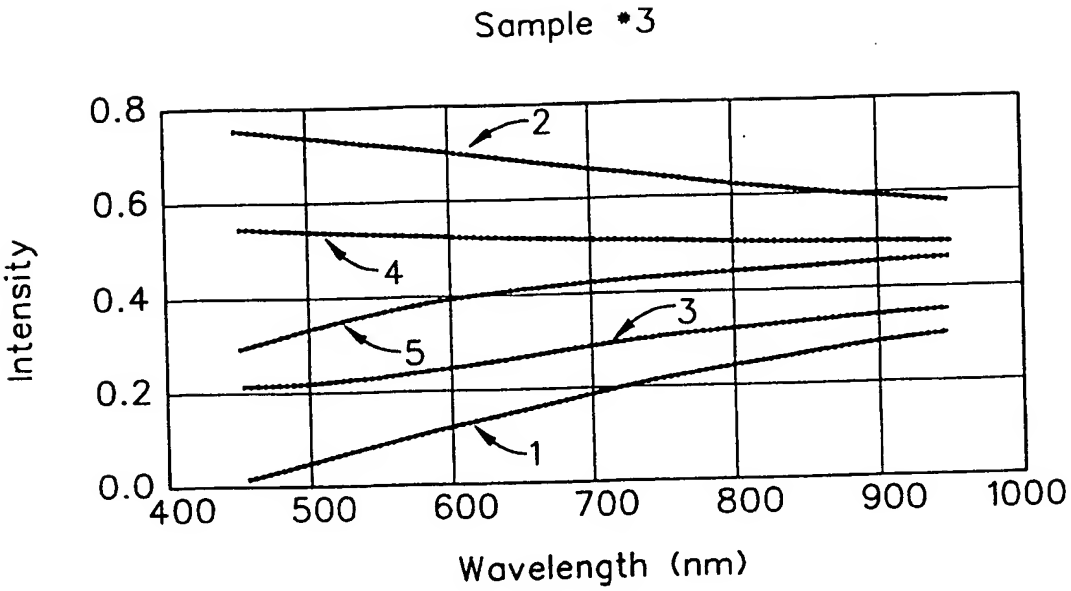

Sample *3
0.8
0.6
0.4
0.2
0.0
Intensity
400
500
600
700
800
900
1000
Wavelength (nm)
1
2
3
4
5

FIG. 14

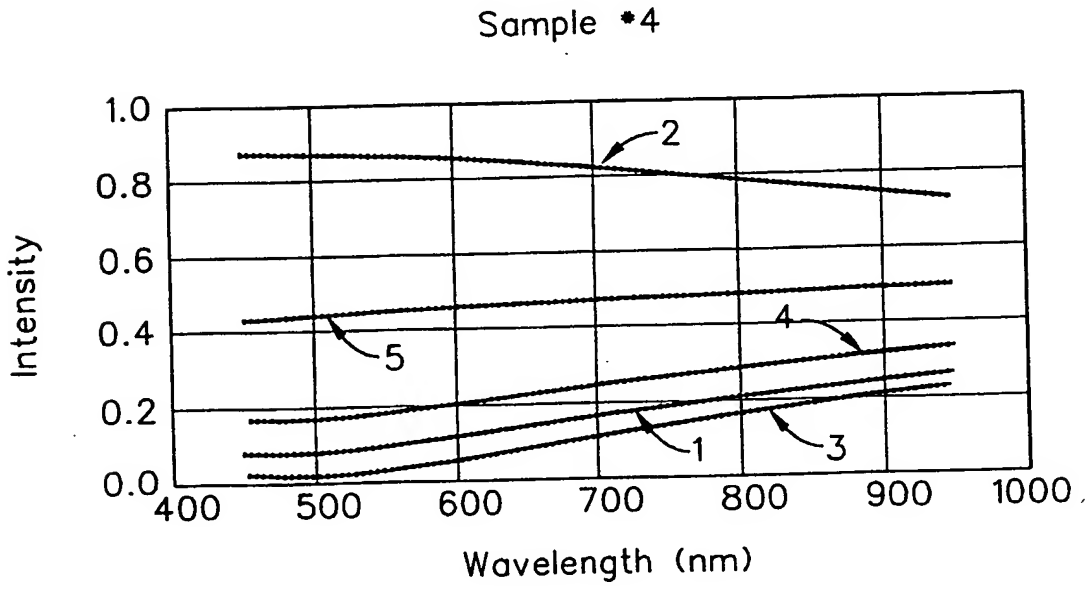

Sample *4
1.0
0.8
0.6
0.4
0.2
0.0
Intensity
400
500
600
700
800
900
1000
Wavelength (nm)
1
2
3
4
5

FIG. 15

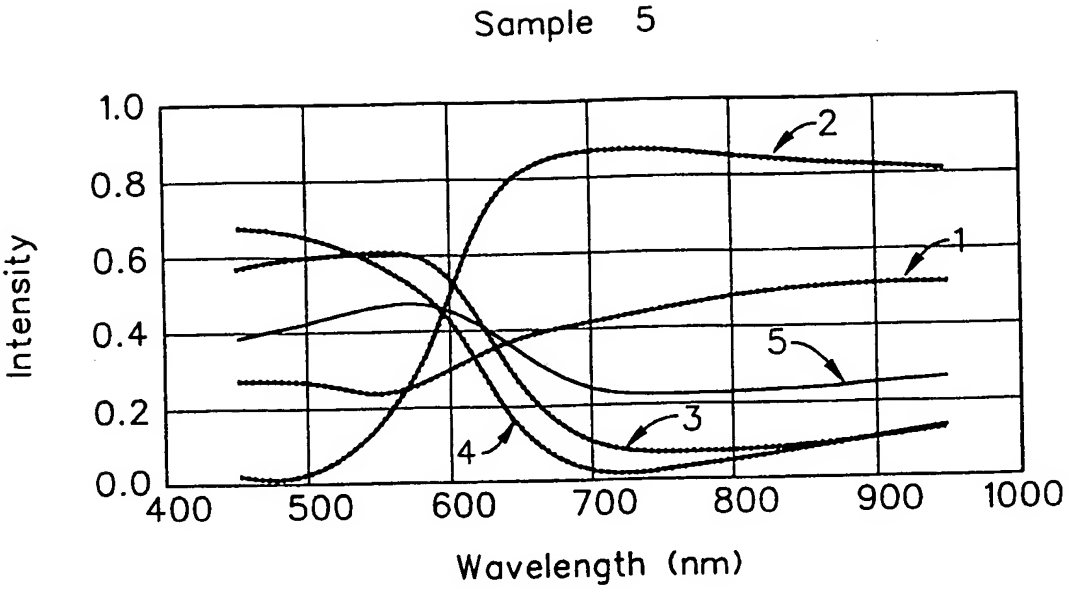

Sample 5
1.0
0.8
0.6
0.4
0.2
0.0
Intensity
400
500
600
700
800
900
1000
Wavelength (nm)
1
2
3
4
5

FIG. 16

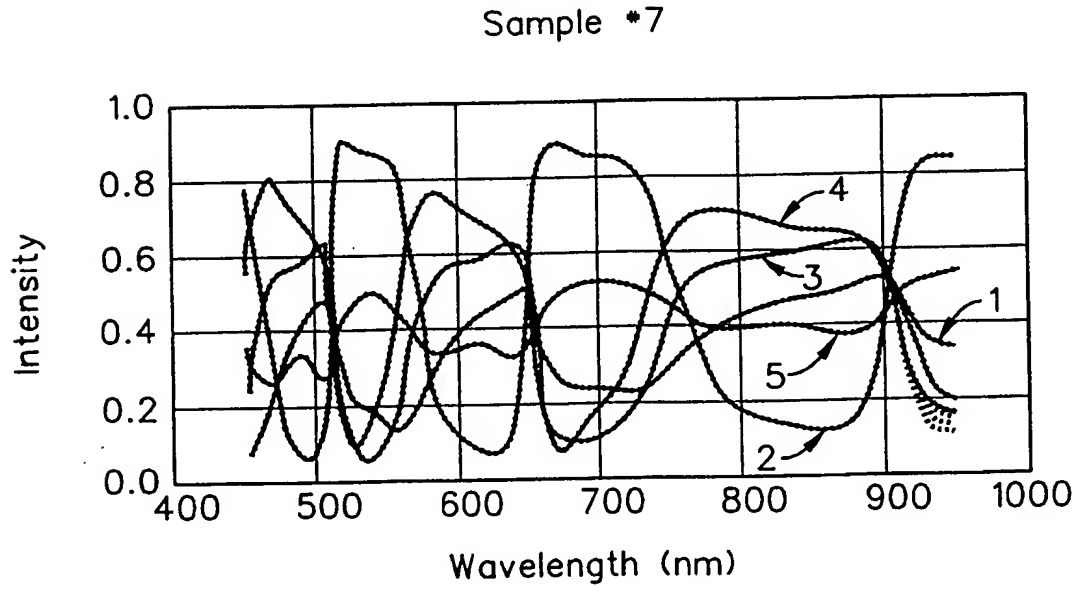

Sample *7
1.0
0.8
0.6
0.4
0.2
0.0
Intensity
400
500
600
700
800
900
1000
Wavelength (nm)
1
2
3
4
5

FIG. 17

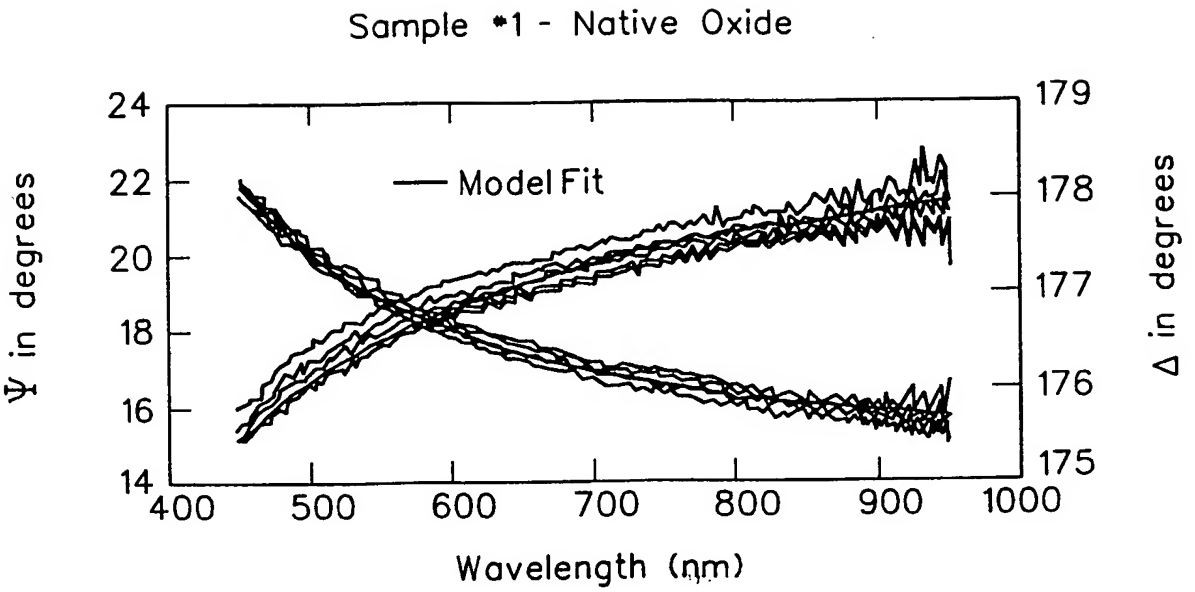

Sample *1 - Native Oxide
Model Fit
Ψ in degrees
Δ in degrees
Wavelength (nm)
24
22
20
18
16
14
179
178
177
176
175
400
500
600
700
800
900
1000

FIG. 19

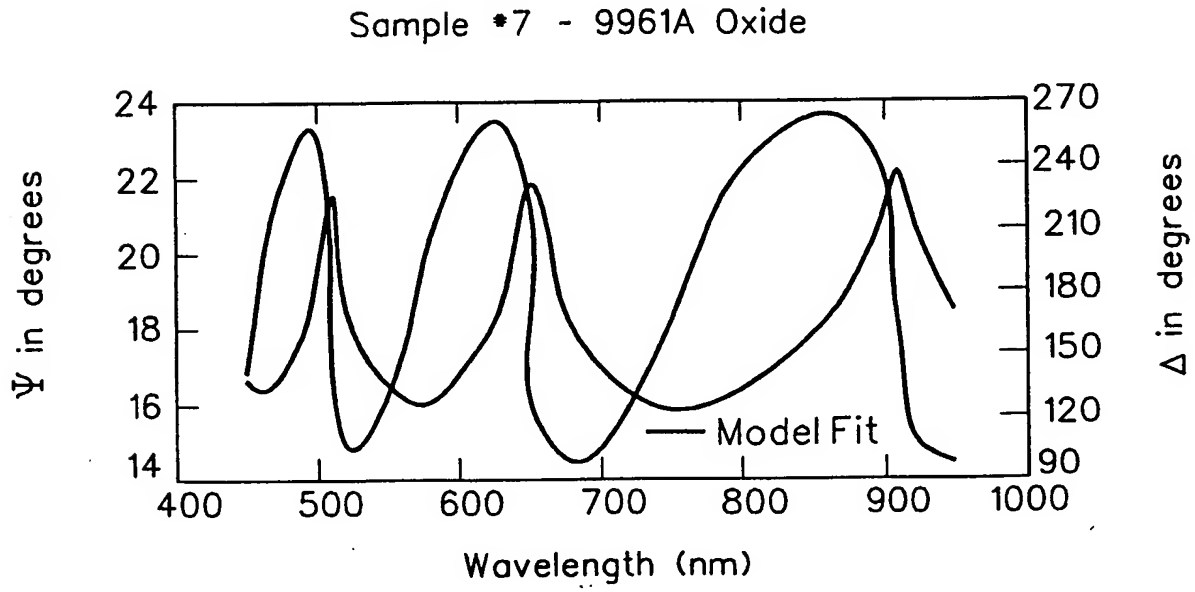

Sample *7 - 9961A Oxide
Model Fit
Ψ in degrees
Δ in degrees
Wavelength (nm)
24
22
20
18
16
14
270
240
210
180
150
120
90
400
500
600
700
800
900
1000

FIG. 20

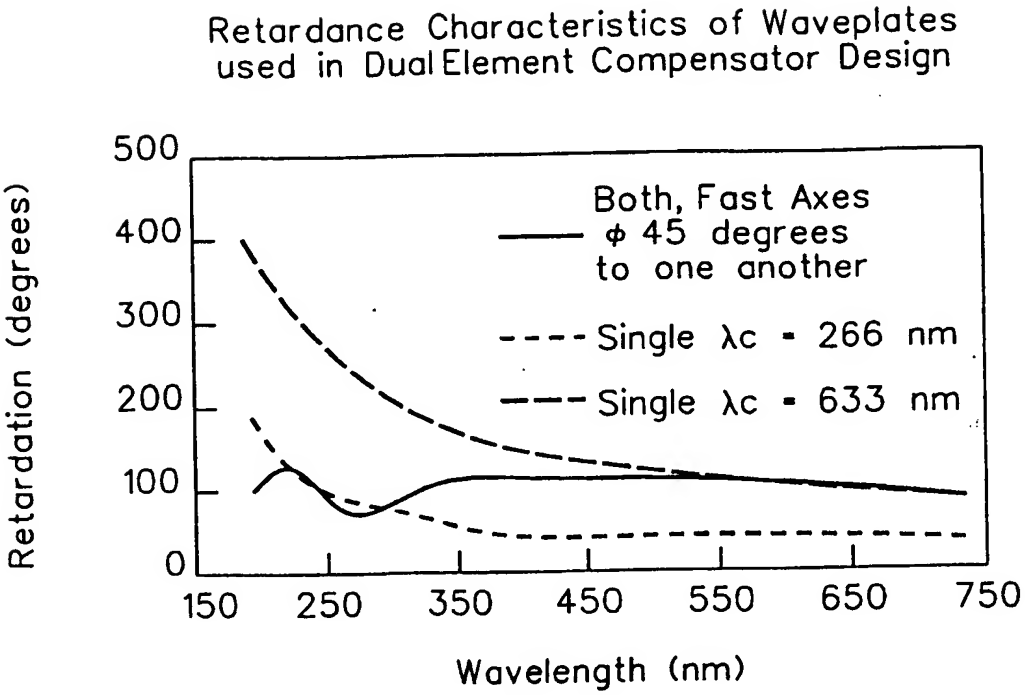

Retardance Characteristics of Waveplates
used in Dual Element Compensator Design
Retardation (degrees)
500
400
300
200
100
0
150
250
350
450
550
650
750
Wavelength (nm)
Both, Fast Axes
φ 45 degrees
to one another
Single λc = 266 nm
Single λc = 633 nm

FIG. 22

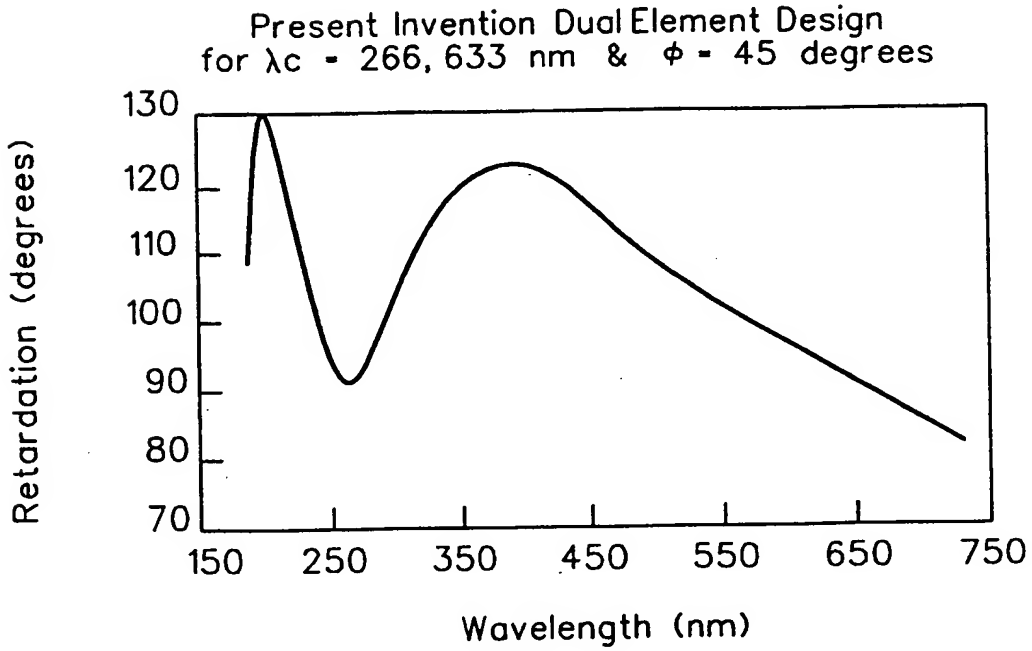

Present Invention Dual Element Design
for λc = 266, 633 nm & φ = 45 degrees
Retardation (degrees)
130
120
110
100
90
80
70
150
250
350
450
550
650
750
Wavelength (nm)

FIG. 23